

Mr. Chairman, Ranking member, and members of the committee, I would like to thank you for the opportunity to take this seat representing American Maritime Officers, Marine Engineers Beneficial Association, Masters, Mates & Pilots and Seafarers International Union for today's hearing. Maritime Labor would like to express our gratitude for the chance to appear before this distinguished congressional committee to provide testimony on the critical issue of ensuring safety in the Marine environment with the introduction of Autonomous vessels.

My name is Christian Spain I am proud to represent the 3400 officers at American Maritime Officers as their Vice President of Government Relations. I have been working for AMO in Washington for about a decade. Prior to that I sailed aboard AMO contracted vessels as a Master and Deck Officer for nearly 20 years. As a collateral duty I currently serve as the Vice-Chair of the International Transport Workers Federation - Maritime Safety Committee. As a member of this committee, I have the honor of representing the worlds 1.9 million seafarers at the International Maritime Organization where we have been discussing policy and regulation surrounding Maritime Autonomous Surface Ships or MASS for nearly 8 years. I have found that MASS are called by different names such as autonomous vessels, Drone vessels or unmanned surface ships. For the purposes of this hearing, I will just refer to these vessels as Maritime Autonomous Surface Ships or MASS. Discussion of the MASS can quickly devolve into a discussion of Classes or variations of autonomy such as the IMO's 4 Classes of Autonomy ranging from MASS with Manual Control to Fully Autonomous vessels. For this limited discussion unless otherwise noted I will assume that we are talking primarily about fully autonomous vessels.

With 33 years in the industry, addressing the safety concerns associated with this transformative technology, I stand here not only as a representative of the seafaring community but as a concerned citizen eager to contribute to the development of policies that prioritize the well-being of the worlds 1.9 million seafarers. My testimony today will focus on the imperative of safety of the seafarers, the challenges and risks associated with MASS vessels, and the steps that both policymakers and industry stakeholders must take to mitigate these risks effectively. In doing so, I aim to shed light on a few of the complex issues surrounding MASS safety and offer insights that can guide the development of legislation and regulations that safeguard the interests of our citizens while fostering innovation.

In my brief time here, I would like to cover three broad areas of what I feel are the most important issues that the committee should take into consideration. First and foremost, safety for seafarers, passengers, the public and the marine environment. Those regulations most recognizable in the maritime industry such as the International Convention for the Safety of Life at Sea (SOLAS), International Regulations for Preventing Collisions at Sea (ColRegs) and International Convention for the Prevention of Pollution from Ships (MARPOL) all deal with almost exclusively the safety of humans and the marine environment. Secondly, commercial shipowners are not clamoring for MASS technology. The Capital Expenditure and Operational Expenditure savings for a MASS vessel seem uncertain at best. Many of the largest ship owners are partnered with companies working on MASS development which on the face of it appears

they are advocates for MASS technology. However, when talking to the largest shipowners you would be hard-pressed to find more than a few who see their ships operating in the coming decades without seafarers aboard. Shipowners are involving themselves in MASS to keep apprised of what is going on; but just because you can do something does not mean you should. There is a niche market for MASS but on the commercial side it is small in grand scheme of things. Lastly, concern regarding the inability of MASS to mitigate marine environmental damage after a collision, allision, grounding or oil spill should be considered.

For the safety of all seafarers MASS must adhere to the existing maritime regulations such as the International Regulations for Preventing Collisions at Sea often referred to in the maritime industry as the ColRegs or "Rules of the Road". Instituting separate parallel regulations for MASS should be given little consideration. For instance, vessels have a duty to render assistance by providing manpower, equipment, and/or shelter to survivors in the event of a maritime emergency. This duty goes back a millennium and cannot be shirked because it is inconvenient for MASS deployment. Additionally, effective communication between MASS and other vessels in the vicinity, maritime authorities and ports is important to the smooth operation in the maritime environment.

The emergence of Maritime Autonomous Surface Ships (MASS) has raised significant questions regarding the adaptation of nearly all existing maritime regulations, particularly the International Regulations for Preventing Collisions at Sea (ColRegs). There is a complex debate surrounding whether the ColRegs should be altered to accommodate MASS or if MASS should be required to adhere to existing regulations. The central argument presented herein is that altering the ColRegs to accommodate MASS is not only unnecessary but also fraught with risks, and that it is imperative for MASS to adapt to the established ColRegs framework. Safety is paramount in the maritime domain, and this testimony underscores the importance of maintaining a uniform set of rules to ensure the safe integration of MASS into our oceans. It explores the challenges and opportunities presented by MASS, the key arguments against modifying ColRegs, and the ways in which MASS can seamlessly align with existing regulations.

Maritime Autonomous Surface Ships (MASS), also known as autonomous ships or unmanned surface vessels, represent a transformative development in the maritime industry. These vessels are equipped with advanced technologies such as artificial intelligence, automation, and machine learning systems, allowing them to operate without direct human intervention. The potential benefits of MASS are numerous, including increased operational efficiency, reduced operating costs, and enhanced environmental sustainability. However, the integration of MASS into the global maritime ecosystem raises critical questions about safety and regulatory compliance.

At the heart of this debate is the International Regulations for Preventing Collisions at Sea (ColRegs), a set of rules established by the International Maritime Organization (IMO) to prevent collisions between vessels and ensure the safety of navigation at sea. ColRegs, also known as the "Rules of the Road," serve as the foundation of safe maritime navigation. They provide a

standardized set of regulations that govern the conduct of vessels, including right-of-way, navigation lights, sound signals, and more.

As the maritime industry stands on the cusp of a technological revolution with the advent of MASS, the question arises: Should the ColRegs be modified to accommodate these autonomous vessels, or should MASS be required to adapt to the existing regulatory framework? I would assert that altering the ColRegs to accommodate MASS is not only unnecessary but also counterproductive to the goal of ensuring safety at sea. Instead, MASS should be expected to conform to the established ColRegs. Integration while maintaining safety is the paramount objective.

MASS are equipped with advanced sensor systems, such as radar, lidar, and cameras, coupled with sophisticated artificial intelligence algorithms. These systems can detect and respond to potential collision threats with a speed and precision that may surpass human capabilities. While these advantages are compelling, they must be carefully weighed against the potential risks and challenges associated with the integration of MASS into existing maritime operations. Safety remains the paramount concern, and the question of how to ensure the safe coexistence of autonomous vessels with manned vessels and traditional maritime practices cannot be overstated.

The maritime industry has a long history of regulating navigation and ensuring the safety of vessels at sea. The development of international maritime regulations, including the ColRegs, has been driven by a fundamental need for standardized rules and practices. The International Regulations for Preventing Collisions at Sea (ColRegs) were first established in 1889 at the International Maritime Conference held in Washington, D.C. The goal was to reduce the risk of collisions between vessels and establish a consistent set of rules for mariners worldwide.

One key principle underlying the ColRegs is the concept of "common practice." This principle dictates that mariners should be able to rely on consistent behaviors and responses from other vessels based on the ColRegs' rules. In other words, vessels navigating international waters should adhere to a shared set of standards and expectations, regardless of their flag state or technological sophistication.

Mariners can anticipate the actions of other vessels based on the ColRegs, enhancing overall safety, and reducing the risk of collisions. This predictability is vital for safe navigation, especially in congested waterways and under adverse weather conditions. A common regulatory framework allows vessels from different countries and operators with diverse backgrounds to navigate safely together. This interoperability is essential for international trade, commerce, and cooperation on the high seas.

The ColRegs assign responsibilities to vessels in various situations, making it clear who is at fault in the event of a collision or navigational error. This accountability is essential for legal and insurance purposes.

Given the historical importance of uniform regulations and the fundamental principles of predictability, interoperability, historical continuity, and accountability, any proposed changes to the ColRegs must be carefully considered in the context of their potential impact on safety and the global maritime ecosystem.

The question of whether the ColRegs should be modified to accommodate Maritime Autonomous Surface Ships (MASS) has generated significant debate within the maritime community. While proponents of modification argue that it is necessary to accommodate the unique characteristics and capabilities of MASS, several compelling arguments suggest that altering the ColRegs is neither prudent nor in the best interest of safety. Safety is the paramount concern in maritime operations. The ColRegs are designed to ensure the safety of vessels and mariners at sea by providing a common set of rules that govern navigation and the prevention of collisions. Any modification to these regulations must be rigorously evaluated to determine whether it enhances or diminishes safety.

One of the primary safety concerns associated with modifying the ColRegs for MASS is the potential for confusion and uncertainty. If MASS were subject to a different set of rules than manned vessels, mariners navigating near these autonomous vessels might struggle to predict their actions and respond effectively. This unpredictability could lead to an increased risk of collisions and accidents and a threat to our marine environment. Moreover, MASS, like all vessels, are susceptible to technical malfunctions, system failures, and cyberattacks. In the event of such incidents, it is crucial that MASS adhere to the same rules as manned vessels to ensure a consistent and coordinated response. Deviating from the established ColRegs framework for MASS could create legal and operational challenges in emergency situations.

In a maritime emergency, a coordinated effort involving various parties is essential to ensure a swift and effective response that maximizes safety and minimizes harm. The specific parties involved can vary depending on the nature and severity of the emergency, but here are some key stakeholders who typically play a crucial role in lending a hand during maritime emergencies are the crew of the distressed vessel, Maritime Authorities and Nearby vessels, especially those in the vicinity of the distressed vessel, may be called upon to aid a vessel in distress. This is a fundamental principle of maritime law known as the "duty to render assistance." Vessels in the vicinity are required to offer support by providing manpower, equipment, or shelter to survivors.

Maritime Autonomous Surface Ships (MASS) represent a cutting-edge development in the maritime industry, with the potential to transform various aspects of shipping, including safety and emergency response. However, when it comes to rendering assistance in a maritime emergency, MASS systems must be equipped to handle such situations in a manner that ensures the safety of human life, property, and the marine environment. The duty to render assistance at sea is a longstanding maritime tradition that has evolved over centuries. It is deeply rooted in the principles of maritime ethics and human solidarity. While it does not have a specific age or date of origin, this duty has been recognized and practiced for as long as humans have been engaged in maritime activities. It can be traced back to ancient seafaring civilizations, such as

the Greeks and Romans. These ancient mariners often came to the aid of shipwrecked sailors out of a sense of duty and honor.

MASS must be able to use both spoken and written language as safe communication is vital for the safety of crew, passengers, industrial personnel or special personnel, ship, and external environment, but also for the efficiency of daily tasks and the ship's integrity. Very High-Frequency (VHF) radio communication is a standard method for ship-to-ship and ship-to-shore communication. MASS like traditional vessels should be equipped with VHF radios to exchange information with nearby vessels, ports, and maritime authorities. This includes communication for collision avoidance, navigation updates, and emergency situations as required by current maritime laws and regulation.

Safe and correct communication is particularly important for ships that cross national borders, especially in connection with radio communication between ships and other actors (land bases, various suppliers, shipping companies, authorities etc.). MASS communication should include acknowledgment of correct receipt and understanding. This applies both to normal operations as well as in maritime emergencies.

It is important that law makers and regulators insist for the safety of seafarers and the public that Maritime Autonomous Surface Ships be held to the same regulatory standards as manned vessels for they are working in and around manned vessels who should be able to rely on consistent behaviors and responses from other vessels regardless of their level of Autonomy. This includes MASS adherence to the ColRegs, MASS ability to comply with a “duty to render assistance” and MASS ability to communicate with manned vessels and other entities for day-to-day operations as well as maritime emergencies.

Maritime labor has been in close communication with many of the largest shipowners since MASS started to be discussed in earnest around 2016. While many of the largest Shipowners work with companies developing MASS technologies the owners continue to worry about the reliability and redundancy requirements of the technology. Unlike traditional ships, which have experienced crews capable of handling unforeseen technical failures, MASS relies heavily on complex systems. A malfunction or cyberattack could lead to catastrophic consequences, including collisions, grounding, or environmental disasters. All the largest shipowners we continue to discuss MASS with do not see a future of commercial shipping that does not include some crewmembers based on these concerns and probably more importantly the costs of not having crew aboard when needed.

The upfront costs of retrofitting existing vessels or purchasing new autonomous ships are substantial. Shipowners have reservations about making such significant investments, especially if the benefits are not immediately realized. While proponents argue that autonomous vessels can reduce operational costs over time, shipowners worry about the ongoing expenses related to maintenance, software updates, and cybersecurity measures. Ships generally are only making money for an owner when they are underway. Without seafarers aboard preventive maintenance would have to be exceptionally well-tailored and timed to occur in geographically

advantageous areas to see cost savings over the life of a vessel based on labor arbitrage. When considering unplanned maintenance and repair it would seem very unlikely to save money when there are no seafarers aboard to repair your vessel. Shipowners question whether the promised cost savings will materialize in practice.

With increased reliance on digital systems and connectivity, shipowners are also concerned about the vulnerability of MASS to cyberattacks. The potential for hackers to gain control of autonomous vessels or disrupt their operations poses a significant safety risk to seafarers and the marine environment.

Determining liability in the event of accidents or incidents involving MASS is a complex and evolving issue. Under current maritime custom operators (Masters), owners and equipment manufacturers typically take the brunt of liability in this order, both civil and criminal. Without an operator the logical replacement would be the “creator” of AI or machine learning for the MASS in question. This leads to the next question of who has jurisdiction over the “creator”? Currently the Master and/or seafarers are held criminally liable and imprisoned. In a situation where a MASS is found criminally liable will the “creator” or the Shipowner be imprisoned? How does one obtain jurisdiction over these people or for that matter a remote operator if there is no extradition treaty with their country of residence? Shipowners worry about the potential legal disputes and the associated financial burdens that may arise from unclear liability scenarios. The uncertainty surrounding the safety and liability aspects of MASS can lead to increased insurance premiums which are viewed as an additional financial burden.

The adoption of Maritime Autonomous Surface Ships (MASS) has garnered significant attention in the maritime industry due to its potential benefits, including improved efficiency. However, it is crucial to acknowledge the potential dangers that MASS poses to the environment. The environmental risks associated with MASS technology, including issues related to energy sources, pollution, navigational challenges, and the broader ecological impact. It underscores the importance of addressing these concerns to ensure that the transition to MASS aligns with the goal of minimizing oil pollution.

The use of MASS does not eliminate the risk of maritime accidents, including collisions, allisions and groundings, which can lead to oil spills and significant environmental damage. The absence of onboard seafarers may hinder the rapid response to oil spills, exacerbating the environmental impact. The International Convention for the Prevention of Pollution from Ships (MARPOL) and the Oil Pollution Act of 1990 (OPA 90) are complimentary and crucial instruments for regulating the discharge of pollutants from vessels, including oil spills. The crew requirements in response to oil spills, emphasize the importance of crew preparedness, vigilant reporting, and effective response measures. Crew members are required to be familiar with spill response equipment, such as oil booms which are essential for effective response. Crew members must be trained to take immediate steps to minimize spillage, such as deploying oil spill containment equipment. Regular oil spill response drills should be conducted to ensure that crew members are well-versed in emergency procedures. Seafarers play a pivotal role in mitigating the environmental

impact of oil spills from vessels. Crew members on board are integral to the effective implementation of MARPOL and OPA 90 regulations and the response to oil spills.

In this testimony I have highlighted three overarching areas that warrant the committee's careful consideration. Firstly, paramount importance must be placed on ensuring safety and well-established regulations in the maritime industry, such as the International Convention for the Safety of Life at Sea (SOLAS), International Regulations for Preventing Collisions at Sea (ColRegs), and International Convention for the Prevention of Pollution from Ships (MARPOL), predominantly address the safety of human lives and the protection of our precious marine ecosystems.

Secondly, I have delved into the fact that commercial shipowners are not fervently advocating for the widespread adoption of Maritime Autonomous Surface Ship (MASS) technology. This advocacy is coming from the developers of MASS. The anticipated cost savings in terms of Capital Expenditure and Operational Expenditure for MASS vessels remain uncertain, with many of the industry's major shipowners maintaining reservations about transitioning away from crewed vessels. It is a reminder that just because we have the capability to pursue a particular path does not necessarily mean it is the most prudent course of action. The commercial applicability of MASS, while promising in niche markets, may not have a significant impact in the broader context of the maritime industry for many decades.

Lastly, it is crucial to consider the concerns surrounding the capacity of MASS to effectively mitigate environmental damage in the aftermath of maritime incidents such as collisions, allisions, groundings, or oil spills. Ensuring that our technological advancements align with environmental protection measures is imperative.

In light of these considerations, the committee should prioritize safety, remain cognizant of the evolving landscape of commercial shipowners concerns and underscore the importance of environmental responsibility when deliberating on the future of MASS technology in the maritime industry. The development of better software, smaller sensors and better communications is leading to the increasing digitalization throughout the global economy. Digitalization in the maritime sector allows the further automation of some functions and better control of processes as a whole. It can enable the increased use of remote-control technology. Many of these technologies could be used to benefit seafarers and improve safety conditions while providing more efficient operations. Other than in niche markets, this technology should be used as a tool and not a complete replacement of seafarers.

Again, thank you Mr. Chairman and the committee for your attention to the pivotal matter.